

0049524

#### CERTIFICATE OF ANALYSIS

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

May 19, 1998

Attention: Joan Kessner

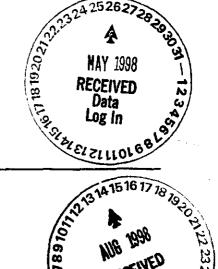
SAF Number : B98-068

Date First Sample Received: April 14, 1998

Number of Samples : One (1)
Sample Type : Other-Liquid

SDG Number : W02329

Data Deliverable : 15 Day Priority/21 Day Summary



I. Introduction

On April 14, 1998, one 15-day TAT "other" sample was received by the Quanterra Environmental Services Richland Laboratory (QESRL) for radiochemical and chemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the Bechtel Hanford, Inc. (BHI) specific ID:

OESRL ID# BHI ID# MATRIX DATE OF RECEIPT 80423801 BONKH3 Other-Liquid 4/14/98

#### II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were: Alpha Spectroscopy

Americium-241, Curium-244 by method RICH-RC-5057

Plutonium-238, 239/40 by method RICH-RC-5010

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017



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# Gas Proportional Counting Gross Alpha by method RICH-RC-5014 Gross Beta by method RICH-RC-5014

#### III. Quality Control

The analytical results for each analysis performed under SDG W02329 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

#### IV. Comments

#### Alpha Spectroscopy

#### Americium-241, Curium-244 by method RICH-RC-5072

The LCS from the initial analysis was not within contractual requirements. In addition, high sample activity caused interference with the tracer recovery. Therefore, we increased the dilution of this sample and performed a reanalysis. The LCS, batch blank, duplicate sample (B0NKH3) and sample results from the reanalysis are within contractual requirements.

#### Plutonium-238, 239/40 by method RICH-RC-5010

High sample activity caused interference with the tracer recovery, therefore, we increased the dilution of this sample and performed a reanalysis. The reanalysis results did not agree with the original analysis, therefore, we performed a second reanalysis. The LCS, batch blank and sample results from the second reanalysis are within contractual requirements. The duplicate sample (B0NKH3) had an RPD of 44% for the Pu-238 and 37% for the Pu-239. Second level RPD evaluation criteria is less than or equal to 40% for water samples.

#### Gamma Spectroscopy

#### Gamma Scan by method RICH-RC-5017

The LCS, batch blank, duplicate sample (B0NKH3) and sample results are within contractual requirements. The MDA values for this sample were elevated since the sample was classified as a category III and a reduced volume of sample was used in the analysis.



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#### **Gas Proportional Counting**

#### Gross Alpha by method RICH-RC-5014

The LCS, batch blank, duplicate sample (B0NKH3) and sample results are within contractual requirements.

#### Gross Beta by method RICH-RC-5014

The LCS, batch blank and sample results are within contractual requirements. The duplicate from the original analysis did not meet the requirements of the contract, therefore, the duplicate (and target sample) were reanalyzed. The duplicate sample (BONKH3) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

Andy Kopriva Project Manager



#### **SAMPLE RESULTS**

LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02329 / 5111

LAB SAMPLE ID:

80423801

MATRIX:

**OTHER** 

CLIENT ID:

**BONKH3** 

DATE RECEIVED:

4/14/1998 2:30:00 PM

			COUNTING	TOTAL		REPORT		METHOD
ANALYT	E RESULT	Q	ERROR (2s)	ERROR (2s)	MDA/IDL	UNIT	YIELD	NUMBER
AM-241	1.8 <b>7</b> E+07		4.9E+05	2.0E+06	1.61E+04	pCi/L	91.70%	RICHRC5057
CM-242	0.00E+00	U	0.0E+00	9.7E+03	8.73E+03	pCi/L	91.70%	RICHRC5057-C
CM-244	0.00E+00	U	0.0E+00	9.7E+03	8.73E+03	pCi/L	91.70%	RICHRC5057-N
PU-238	2.07E+05		3.5E+04	4.0E+04	8.13E+03	pCi/L	<b>82</b> .80%	RICHRC5010
PU239/4	0 1.30E+07		2.7E+05	1.3E+06	8.13E+03	pCi/L	82.80%	RICHRC5010
AM-241	2.34E+07		1.1E+06	2.6E+06	N/A	pCi/L	N/A	RICHRC5017
CO-60	6.06E+03	U	2.1E+04	2.1E+04	4.55E+04	pCi/L	N/A	RICHRC5017
CS-137E	A 1.17E+04	U	1.6E+04	1.6E+04	3.38E+04	pCi/L	N/A	RICHRC5017
EU-152	2.1 <b>9E</b> +03	U	4.0E+04	4.0E+04	7.40E+04	pCi/L	<b>N</b> /A	RICHRC5017
EU-154	-1.64E+04	U	4.6E+04	4.6E+04	8.33E+04	pCi/L	N/A	RICHRC5017
EU-155	-2.05E+04	U	4.5E+04	4.5E+04	7.30E+04	pCi/L	<b>N</b> /A	RICHRC5017
RA-226	3.21E+04	U	4.3E+04	4.3E+04	8.24E+04	pCi/L	N/A	RICHRC5017
ALPHA	3.58E+07		5.4E+05	7.5E+06	1.48E+04	pCi/L	100.00%	RICHRC5014
BETA	4.03E+06		3.5E+04	3.8E+05	2.65E+03	pCi/L	100.00%	RICHRC5014-B

Number of Results: 14

# Quanterra Data Review Checklist RADIOCHEMISTRY

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Due Daze: 4-29-9 9	_	· · · · · · · · · · · · · · · · · · ·		
Lab Sammle Number or SDG: WP2329				
Method Tex Parameters Am / Cm				
Marine Other (Liquid)				
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3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	<u> </u>	<u> </u>		
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6. Is the LCS result within acceptance criteria?		İ	i	
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D. Other	<u> </u>	<del> </del>	_ <del></del>	
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6. Units shecked?		<del></del>	_ <del>-                                    </del>	<del></del>
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First Level Review:		_ Date:		5-4
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Form =: LS-038,2/96, Rg/c4	<del></del>	Date	:	11.166

NONCORPORALIST MEDICAL 
### QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-98-NCM Initiated by: Project ID: Sample Numbers: Tests: W02329 Matrix: Analytical Area (check appropriate area): ☐ Wet chemistry Data review Q GC Sample control ☐ Metals HPLC Radiochemistry Organic preparation ☐ Bioassay ☐ Reporting ☐ Inorganic preparation GC/MS Nonconformance (check appropriate area): Holding Time Violations (exceeded by days) Quality Assurance/Quality Control ☐ 17. QC data reported outside of controls Category I: Laboratory Independent ☐ I. Holding time expired in transit 18. Incorrect procedure used 2. Sample received > 48 hrs. or 1/2 holding time has ☐ 19. SOP intentionally modified with QA and Tech. approval expired 3. Test added by client after expiration 20. Invalid instrument calibration 21. Insufficient sample received for proper analysis Category II: Laboratory Dependent Incorrect or Incomplete Client Deliverable □ 4. Instrument failure ☐ 22. Hardcopy deliverable error □ 5. Analyst error 23. Electronic deliverable error ☐ 6. Login error Reported detection limits elevated due to: ☐ 7. Miscommunication 8. Other (complete description required) □ 24. Sample matrix Category III: Analysis Reruns (QA/QC) 25. Insufficient sample volume ☐ 26. Other (complete description required) 9. Surrogates 27. Other (specify): Leanal □ 10. Internal Standards ☐ 11. Spike Recoreries Comments/Explanation: □ 12. Blank Contamination Category IV: Analysis Reruns (Confirmation) □ 13. Second column □ 14 Contamination check ☐ 15. Confirmation of matrix effects 16. Other (complete description required) Notification (check appropriate area): Client notified by (name and date): Client's name and response: in writing by facsimile process "as is" O re-sample . other (explain) on hold until □ by telephone O other (explain) Project Manager (signature and date):

# QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM) PAGE 2 OF 2

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·	10 for 1 tolks	LOG#: RD-98
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Corrective Action  Remarks 3 per formel  Walnut and and all an  activity, formely 5,3	Initial and Date:	M-58-98 Incel por Ge Creased trace
Responsibility for performing CA assigned to:		
Actions to prevent recurrence	Initial and Date:	
First Level Supervisor: /oll Thems	Jama	Date: 5-8-58
Responsible Manager:	i Waddell	Date: 5719/98
Quality Assurance Review		
☐ Anomaly ☐ Further action required:	☐ Deficiency	<b>A</b> Rerun
Assigned to:  QA signature:  QA sign	0/2	
Corrective Action Verification  U Verified Cannot Verify (specify reason):		
Nonconformance Memo Closure  QA signature/date: Odu O	5/zc	0/98

# Quamerra Data Review Checklist RADIOCHEMISTRY

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# Quanterra Data Review Checklist RADIOCHEMISTRY

Work Order number (s): 804338				
Client D. BHI				
4-29				
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Form #: LS-038.2 /96, Rev. 4 /			7-	+

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## Quanterra Data Review Checklist RADIOCHEMISTRY

Client ID: BHI				
Due Date: 4-29-98				
Lab Sample Number or SDG: W \$2329				
Method Test Parameters Alpha			<del></del>	<del></del>
Matrix Other				
Review (tem	Ya(/)	No(√)	<b>⊒</b> A(√)	2" Level
A. Calibration	<u> </u>		1 -	Renew (-/)
1. Is the calibration documentation included where applicable?		-		
B. Sample Analysis				
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3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	149			1
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### Quanterra Data Review Checklist RADIOCHEMISTRY

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Work Order mumber (s): 80423 8				
Cilem ID: BHI				
Due Date: 4-29-98				
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0				
Method Test Parameters: Deta				
Marine Other (Liquid)				
Review (tem	Ys(-/)	No(1)	MA(√)	I"Level Review(/)
A. Calibration				
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B. Sample Analysis	1			_
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4. Is the blank > 1/2 the Contract Detection Limit but < Contact Detection Limit?	1		<del></del>	
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3. Correct methodology used?				<del>-   -   -   -   -   -   -   -   -   -  </del>
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First Level Review:    March   Confirmation   Confi		Date		-98 21/95
Form #: LS-038,2/96/Rev.4		Date	" <del>— '/-</del> '	<del>-/</del> -

# QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM) PAGE 1 OF 2 LOG # RD-98-\_\_\_\_\_

LOG #: RD-98-

Project ID: BH1	NCM Initiated by:
Sample Numbers: 80923801 , D0423801	JOY238 18, 15
Tests:	. 11 - 2020
Matrix: Other 122 12	WO 2329
Analytical Area (check appropriate area):	en e
☐ Sample control ☐ GC	☐ Wet chemistry ☐ Data review
Organic preparation O HPLC	Metals     Radiochemistry
☐ Inorganic preparation ☐ GC/MS	☐ Reporting ☐ Bioassay
Nonconformance (check appropriate area):	
Holding Time Violations (exceeded by days)	Quality Assurance/Quality Control
Category 1: Laboratory Independent	☐ 17. QC data reported outside of controls
☐ 1. Holding time expired in transit	☐ 18. Incorrect procedure used
2. Sample received > 48 hrs. or 1/2 holding time has	☐ 19. SOP intentionally modified with QA and Tech. approval
expired	
☐ 3. Test added by client after expiration	☐ 20. Invalid instrument calibration
Category II: Laboratory Dependent	21. Insufficient sample received for proper analysis
4. Instrument failure	Incurrect or Incomplete Client Deliverable
5. Analyst error	☐ 22. Hardcopy deliverable error
☐ 6. Login error	☐ 23. Electronic deliverable error
7. Miscommunication	Reported detection limits elevated due to:
☐ 8. Other (complete description required)	☐ 24. Sample matrix
Category III: Analysis Reruns (QA/QC)	☐ 25. Insufficient sample volume
9. Surrogates	26. Other (complete description required)
☐ 10. Internal Standards	77. Other (specify): Namaly 5/3
☐ 11. Spike Recoveries	performed 0
☐ 12. Blank Contamination	Comments/Explanation:
Category IV: Analysis Reruns (Confirmation)	
☐ 13. Second column	
☐ 14. Contamination check	
☐ 15. Confirmation of matrix effects	
☐ 16. Other (complete description required)	
Notification (check appropriate area):	
Client notified by (name and date):	Client's name and response:
in writing C D by facsimile	process "as is" re-sample
☐ by telephone ☐ other (explain)	on hold until other (explain)
Project Manager (signature and date):	pdgs

# QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM) PAGE 2 OF 2

LOG#: RD-98-\_\_\_\_

Corrective Action	
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Responsibility for performing CA assigned to:	
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This Level Supervisor.	Date: 5/19/69
Responsible Manager: / XuGulluc W	Middle Date: 5/19/98
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Quality Assurance Review	
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Nonconformance Memo-Closure	
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# CHAIN OF CUSTODY FORMS

Bechtel Hanford	Inc.	Cl	HAIN OF CUST	rody/s	AMPLE	ANAL	YSIS I	REQUES	r	B98	8-068-05	Page 1 of 1
Collector  Ly Bry 12  Project Designation  233-S Plutonium Concentrati		DAU Sampl	any Contact  SENCK  ing Location	Telepho	ne No.		[	Project Coordi TRENT, SJ SAF No. B98-068	Days			
Sinc - 286	)	Field I	Logbook No.					Method of Ship	Vehic	12		
Shipped To Quanterra Incorporated		Offsite	Property No.		**			Bill of Lading/	/			
Waste Designation Client	t determined no wast	e codes associate	d with this project.		·			COA				
POSSIBLE SAMPLE HAZA	RDS/REMARKS		Preservation	None	None	None	None					
		·	Type of Container		(0)	(9P	(9"   M37					
Special Handling and/or Stor	age		No. of Container(s)  Volume	رخ کر داری 200ml	1 - 200inl	200ml	1000m		i i	E		
90112	SAMPLE ANAI	LYSIS	SDC- 102329	Americium- 241/Curium- 244	Gross Alpha, Gross Beta	Isotopic Plutonium	See item († Special Instruction					
Sample No.		Sample Date	Sample Time	ar given j	THE RES	· Chief	个的数	的。经验的	地等的學			
BONKH3	Other Liquid	4-14-48	1 1040	X	X	X	$\geq$					
					SPEC	IAL INSTR	UCTION	ks			<u></u>	]
clinguished By chinguished By	Date/Time '95 9-19-93 Date/Time	Luxui	Akilya	ate/Fime/4 4-/4-9 ate/Fime				nericium-241, Ces Radium-226) Le Volumente Volumente		-	1	S = Soil SE = Sediment SO = Solid SI, = Sludge W = Water O = Oni A = Air
elinquished By	Date/Time	Received By	Di	ate/Time								DS = Drum Solids DL = Drum Liquids T = Tissue W1 = Wipe
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#### **GAMMA-RAY ENERGY ANALYSIS REPORT**

Thermo Hanford Inc.

Radiological Counting Facility

THI - RCF

FOR SAUPY
BONKH3

Project			233-	S					
Customer (	)		BON	KH2	Solution				
RCF ID			RCF	3087					
			Sam	ple time, da	rte		4/6/98		
			Anai	ysis date			4/6/98		
sotope		Activity		÷					
		pCi/gm		2 <b>5 6</b> IT	Cligm				
K40	<	3.7 <del>e+</del> 00			3.79-12				
Co60	<	8.1e-01			8.1e-13				
1129	<	8.6 <del>a+</del> 01			8.6e-11				
Cs137	<	1.0 <del>a+</del> 00			1.0e-12				
Eu152	<	2.4e+00			2.4 <del>a-</del> 12				
Eu154	<	2.3e+00			2.3e-12				
Eu155	<	1.6a+00			1.6e-12				
Th232dau	<	2.6e+00			2.6e-12				
U235	<	3.7e+00			3.7e-12				
U238	<	5.6e+01			5.6e-11				
U238dau	<	1.1e+00			1.1e-12				
Np237	<	7.8e-01			7.8e-13				
Am241		1.2e+04	+/-	3. <del>6e+</del> 02	1.2e-08				
Tot Act Gam (p	CVgm)	1.2e+04		Ci/gm	1.2e-08				
Y/Sr-90	<	N/R							
Gross Alpha	1	3.0e+04	+/-	3.0e+03	3.0e-08				
Gross Beta		3. <del>2e+</del> 03	+/-	4.5e+02	3.2e-09	Repo	rted as 137-Cs Be	etas.	
AEA total		3.5e+04	+/-	3.5e+03					
					Total Activity (pC	iigm)	3.8e+0	14	
239/240-Pu		2.6E+04			(0	Sign)	3.8e-0	8	
241-Am		1.3E+04							
Definitions:						Notel	152-Eu is not a 10	00% Beta emit	ter.

Note: 152-Eu is not a 100% Beta emitter.

N/R means no result or analysis not requested.

7. L. Radiological analyst Date

Albert I. Davis
Radiological Manager

4/9/98 Date

Page 1

Post-it\* Fax Note

7671

376-8851

29.9-6.65

373-

All errors reported at 2 standard deviations

A. Assigned as residual beta from Gamma/Beta balance
For soils and natural samples, the following applies.

The analysis of U238 is based on the activity of Pa234m

The analysis of Np237 is based on the activity of Pa233

U238dau is the activity of Pb214 and 8i214, short fived daughter products of U238. Equilibrium between parent and daughter products probably does not axist in disturbed meterials.

Th32dau is the polivity of Ac228, Pb212, and Ti206, short lived daughter products of 232Th. Equilibrium between parent and daughter products may not exist in disturbed materials.

Other samples, not containing natural materials, may have inapplicable results for the Tb, U, transurance and daughter products. The results must then be balanced for the gross siphs analysis.

#### Figure 1

#### SAMPLE CHECK-IN LIST

Date/Time Received: 4-14-98 1430 sg#: 60232	2 <i>9</i>
Work Order Number: 804238 SAF #: 1398-0	
Shipping Container IDE SMC - FG Chain of Custody # 1898-0	X08-05
1. Custody Seals on shipping container intact?	Yes [] No []
2. Custody Seals dated and signed?	Yes [   No []
3. Chain-of-Custody record present?	Yes []_No []
4. Cooler temperature	
5. Vermiculite/packing materials is	Wet [] Dry []
6. Number of samples in shipping container.	·
7. Sample holding times exceeded?	Yes [] No []
8. Samples have:	-
9. Samples are:in good conditionleakingbrokenhave air bubbles	
<ul><li>10. Where any anomalies identified in sample receipt? Yes [] No</li><li>11. Description of anomalies (include sample numbers):</li></ul>	
•	
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Sample Custodian/Laboratory:	4-14-7
Telephoned To:OnBy	

804238 Rod.

#### **Client Sample Screening Results**

14-Apr-98



CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUT	ES CNTS	NET CPM A	CNTS B	NET CPM B
BIII BONKII3	LIQUID	4/14/1998 2:30:00 PM		4/14/1998 3:05:10 PM 4/14/1998 5:29:05 AM	B0NKH3 BKG	7		22 2719.12857 50 0.07142857	, 8424 634	
Ani Date: 4/14/1998 Ppt mg: 0.1		Alq: 2.50E-02 /	, 1.00E-01 / ml	Alp; (Dpm/ 8.46) Bet; Alq): -5.38	(	9.53E-01 -6.05E-03	(pCl/ 3.8 L(g): -2.4	1E+07 <u>+</u> 2.0E+0 2E+05 <u>+</u> 1.5E+0	05 CAT III -	6.6E-07 Lab 2.5E-02 Lab

0028



CUSTOMER	١	ANALYSIS	Am 241
MATRIX Other (liquid)	)	SAMPLE DE	ELIVERY GROUP WO2329
	,	BATCH NUI	MBFR
pa), /pada s	-a ci - /	./	0
( / Wagan 7		please	analyze /4 ml
LAB SAMPLE ID	28JA879	ERJA130	COMMENTS Sa anakl)
1) 8042380 l	11.15 71 77,111.29	75.3/5/39 EZ.3/5	
2) Do(2380	ESJA32.	ISJA682	0.0000027
3)			<u> </u>
4)	The marker and a	- 1	
5)			
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12)			
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16)			
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LAB QC ID	TOJAGTT		· · · · · · · · · · · · · · · · · · ·
BLANK) J04238 2 B			
	IQ0197		٥٠ ح
	r.1/2019 Em. 1. 20/00		
,			
	ACTIONS (In	ritial & Date)	
Ac 11	20.60	•	- 11000 /
I) INITIATED	7078	4) SEPARA	ATION LAB RECEIVED 5498 C SOP(S) # 255057 F. SE 5-8-98 RICHRCS 003.1
SOP(S) #	HKCODOCKU	Z , ,	SOP(S) # (こちひろり
		24 PG 7	TO STRING RICHROS 333.)
2) PREP LAB RECEIVED 4.50 -	98 or	LAB RECE	III OMILLADOREMENT
SOP(S) # RICHE			PP(S) #
· · ·			
			REVIEWED AND CAL PREP STORED 1765-8-98 SOP(S) # KIGHR COOP
3) SAMPLE REMAINDER STORED	4-30 mg De	ANALYTIC	CAL PREP STORED 1/15-8-98
SOP(S) #			SOP(S) # RIGHRCOOD
inco-ptile			7
we = zw			RC-048 10/96 REV 3



CUSTOMER BHI		ANALYSIS	Pu30	
MATRIX Other Ligo	uid	SAMPLE DE	LIVERY GROUP	W02329
pa/L 20dem tracer	Yes me of	HATCH MUR Children S	MBER	a anal
LAB SAMPLE ID	I3H5024	ID	COMMENTS	(_)
1) 80423801	Asia Salaman Salaman			2.7xe-6
2) D6423801	ISH5923 2:47.80 II.47 E			2.7×e-6
3) 4)				<u> </u>
5)				
6)				
7)	<del>                                     </del>			
9)			<del> </del>	
10)				
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15)				
16)				
18)				<u> </u>
19)				
20)				
LAB QC ID				
BLANK) 1042383B	7 2 47 7 27 1 7			C.2
SPIKE) 10423835	I07:I088			c.2
	ACTIONS (Ini			
1) INITIATED	1X-5-12-98 RICHBCOOD2	4) SEPAR	ATION I AR RECEIV	FD 05/14/98 f.
SOP(S) #	RICHREGODZ	le,12_	SOP(S) #	PED 05/14/98 for RICHEC 5010
2) PREP LAB RECEIVED 5- SOP(S) # RV	13-94 oc	5) COUNT LAB RECE	ING/MEASUREMEN	NT 5 <u>  \$ <b>98</b> </u>
3) SAMPLE <b>R</b> EMAINDER STORE SOP(S) #	D 5-13-95 me	6) DATA R ANALYTIC	REVIEWED AND CAL PREP STORED SOP(S) #	MS898
Ct time = 500	ED 655/1	5/98 2	ata cak - 9	7x 4700 REALISTUS C-013 10/96 REV 3
CC EIME = 300	Richalso.	39	RO	2-0-43 10/96 REV 3
RPT units = pCi/L		•		0029

DI	2998 CUSTOMER: BHI MATRIX : OTH	CHAIN-0	OF-CUSTODY	MPLE DEL	NALYSIS IVERY G	ROUP L		-Apr-19 ge 1	98
				CUSTON	tER				
	QES ID	•	ACCOUNT	ID		4/1/4 50-0	COMMENTS		
		Raf bak		•	SA ANK			======	<b>=</b> ^
					25	GERIF	18APRAS	1235	00
			7mm 97 1200		25	16	18APR 98	1234	<u>o</u> -ns
	1 ) 8042380	1 14Apeqs 10	BHI	BONKH3	0.625.0°	4023	18APR98	1239	and _
	DO423801	1-APR98 1	O40		0.2504	GER	718APR98	_1316	00
	INITIATED SOP(S) #	214/1 RD2	S198			1EASUREMI	ent Lab <u>&amp;</u> P(s) # <u>R</u> (C	LQ 4/18 HRDOCC	198 71201
2)	PREP LAB RECEI	VED <u>4-17-</u> 9	it on			WED AND	DRED MO	4-28-9	
	SOP (S	) # <u>Rkhe</u> s	25017-1				TAT	CHOC	0.7
3)	SAMPLE REMAIND	ER STORED	4-17-9t D	K.		SOP	(S) # <u>/C</u>	~11 KCC	Rev Z
4>	SEPARATION LAB		~/~	-	8	add. Ama Ra	4111		41 -
S	A Appears to be	water				' La	$\mathcal{V}$		
B	ebues aliquot: C	AT III				l			
R	ept units = pcille								
c	it time = 50								
c	LT INST = GER								
	3E0 =25								

1,000,08	CHAIN-OF-CUSTODY	BATCH ANALYSIS RECO	ORD	15-Apr-1998 Page 1
CUSTOMER: BHI MATRIX : OTHER	B98-068 SAM	IPLE DELIVERY GROUP  BATCH NUMBER	W023	38 38
	DUP ACCOUNT	CUSTOMER ID POTWT (mi)	COM Bapaqy 884	MENTS 48 /ca
JO423815 P	QEG1814 1.9/29/97 EX.9/29/98	0.6		lop
1 ) 80423801	BHIacto4	BONKH3 0.3		100
Do 425801	0.0103	0.2	k v	100
3) SAMPLE REMAINDER	115198 RODOD 21-17-95 DVR RICHTESO14-0 # RX+18C SOW-1	(Initial & Date) 5) COUNTING/MEASUM 6) DATA REVIEWED ANALYTICAL PREP	SOP(S) (	AB OP 4/18/98  # RICHEDOO 3 Per 1  APC 428-98  RICHRODOZ  Je
4) SEPARATION LAB RE	ECEIVED DP(S) #			



Proc RPT ct

sug aliq = ABSORBER

CUSTOMER BHI		ANALYSIS	1	Set	
MATRIX Other ()	igual)		ELIVERY G	ROUP	
Cat III	· ./	BATCHNU		at /22 &	<del></del>
LAB SALMIED	My 23 gs CUSTOME	() 11/	50min	G fr	
1) 8047380 /		Ø.00028		ZENTS 25APR98	<i>o</i> p
2) 00473801	0.1	0.00027	26 D	03/1F~10	<del></del>
3)	0.=	0.00	THE V		
4)	DOT WT	SA WAL			
5)	(ma)	(L)			
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19)			Ţ		
20)					
		1 (1)	V2		
LAB QC ID					
BLANK) JOY23828	0.1	0.2	26A	25APR98	<i>0</i> p
SPIKE) JO423825	227	0.2	268		6
	0.6	T		<u> </u>	
<del></del>		o ± 0.375	52 dom		
4 -		Initial & Date)	, _,		
1) INITIATED SOP(S) #	24-23-98 <u>CCHR GOOZ</u> RO	4) SEPAR 2して		RECEIVED P(S) #	
2) PREP LAB RECEIVED 4-2 SOP(S) # R	LU-EX DR CHRCSON-O	LAB RECE	TNG/MEASI EIVED <u>PAU</u> DP(S) # _a_	JREMENT 434/98 425/4440	4-28-98 4-28-48
			ארא R <b>EVIE</b> WED		1 8/10
3) SAMPLE REMAINDER STORE			CAL PREP S		.4-40x 10
DISH SIZE = 1.5 SOP(S) #	الد	<del>_</del>	SOP(S) #	//_4	escheloso,
Proc = 3009				1 .	Ser
RPT units = PCC/L					
nt time = 50	•	- •		RC-048 10/9	6 REVÀN 32



252627282030

RECEIVED Data

## CERTIFICATE OF ANALYSIS SDR FOR SAMPLE BONKH3

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

May 26, 1998

Attention: Joan Kessner

SAF Number : B98-068

Date First Sample Received: April 14, 1998

Number of Samples : One (1) Sample Type : Other-Liquid

SDG Number : W02329A
Data Deliverable : 15 Day Priority/21 Day Summary

I. Introduction

14

On April 14, 1998, one 15-day TAT "other" sample was received by the Quanterra Environmental Services Richland Laboratory (QESRL) for radiochemical and chemical analysis. An additional request for Np-237 analysis on a seven day TAT for this sample was initiated on 4/27/98 by Steve Trent. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the Bechtel Hanford, Inc. (BHI) specific ID:

QESRL ID# BHI ID# MATRIX DATE OF RECEIPT
80448601 BONKH3 Other-Liquid 4/14/98

#### II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were: Alpha Spectroscopy

Neptunium-237 by method RC-5064



Bechtel Hanford, Inc. May 26, 1998 Page 2

#### III. Quality Control

The analytical results for each analysis performed under SDG W02329A include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

#### IV. Comments

#### Alpha Spectroscopy

#### Neptunium-237 by method RC-3208

The initial Np-237 analysis was performed without an MS and the LCS recoveries were low at 45.2% and 52.59%. In addition, the RPD was at 35%. Therefore, a reanalysis was performed. The LCS, batch blank, MS, duplicate sample (B0NKH3) and sample results are within contractual requirements. There was a second LCS analyzed that was slightly low at 69.2%

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

Andy Kopriva Project Manager



#### **SAMPLE RESULTS**

LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02329A/ 5212

LAB SAMPLE ID:

80448601

**MATRIX:** 

**OTHER** 

CLIENT ID:

B0NKH3

DATE RECEIVED:

4/27/1998 12:00:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT	Alerd	METHOD NUMBER
 NP-237	0.00E+00	IJ	0.0F+00	0.0E+00	2 10F±03	nCi/l	100 00%	RICHRC5064

Number of Results: 1

#### Quanterra Data Review Checklist RADIOCHEMISTRY

Work Order number/sh: 804486				
Client ID: RHI				
Due Date: 4-29-98				
Lab Sample Number of SDG) WO-2329 A				
Method Test Parameters: Np.237		<del></del>		
M 1 = 1 = 0				
Mannie U/ har Light de	Yes(√)	No(√)	WA( <b>√</b> )	
				Review (4")
A. Calibration  1. Is the calibration documentation included where applicable?		i		·
B. Sample Analysis			<u> </u>	
Are the sample yields within acceptance criteria?				
2. Were all sample helding times met?		<u> </u>		
3. Is the sample Missimum Detectable Activity < the Contract Detection Limit?		1 -N'C	ļ	<del></del>
C. QC Samples	<u> </u>	· / v	<del></del>	<del></del>
1. Is the blank yield within acceptance criteria			<u> </u>	<u> </u>
2. Is the Minimum Detectable Activity for the blank result ≤ the Commacs Detection Limit?				/
3. Is the blank result ≤ 1/2, the Contract Detection Limit?				1/
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?				<u> </u>
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?				
6. Is the LCS result within acceptance criteria?	-45	35 /	V Cun	1/
7. Is the LCS yield within acceptance criteria			<u> </u>	1/
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?			<del>                                     </del>	1/
MS/MSD results and yield meet acceptance criteria?		<del></del>	AHE	
10. Duplicate sample results and yield ment acceptance criteria?	<u> </u>	<del> </del>	<del></del>	
D. Other	<u></u>	<u> </u>	<del>_</del>	
1. Are all Nonconformances included and noted?	1/Alca			i /
2. Are all required forms filed out?			1	1
3. Correct methodology used?				1
4. Transcription checked?				
5. Were all calculations checked at a minimum frequency?		T		!
6. Units checked?		<del> </del>	<del></del>	1/
Comments on any "No' response:		·		
<del></del>				
First Level Review: 100 Kingama		. Date: _	5-21	6-38
Second Level Review:  Form #: LS-038.7/96, Rev. 4		Date_	5/26	/98
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# QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM) PAGE 1 OF 2

	LOG = RD-98-
Project ID: BHI	NCM Initiated by: MC 5-26-98 * ***
Sample Numbers: JOY 48635	8601, DUY48601, WOY4860/
Tests: No 237	
Matrix: Other Cyina	
Analytical Area (check appropriate area):	The state of the s
☐ Sample control ☐ GC	Wet chemistry Data review
Organic preparation HPLC	Metals Radiochemistry
☐ Inorganic preparation ☐ GC/MS	☐ Reporting ☐ Bicassay
Nonconformance (check appropriate area):	
Holding Time Violations (exceeded bydays)	Quality Assurance/Quality Control
Category I: Laboratory Independent	☐ 17. QC data reported outside of controls
☐ 1. Holding time expired in transit	C 18. Incorrect procedure used
2. Sample received > 48 hrs. or 1/2 holding time has expired	19. SOP intentionally modified with QA and Tech. approval
☐ 3. Test added by client after expiration	☐ 20. Invalid instrument calibration
Category II: Laboratory Dependent	☐ 21. Insufficient sample received for proper analysis
4. Instrument failure	Incorrect or Incomplete Client Deliverable
5. Analyst error	☐ 22. Hardcopy deliverable error
☐ 6. Login error	☐ 23. Electronic deliverable error
☐ 7. Miscommunication	Reported detection limits elevated due to:
8. Other (complete description required)	24. Sample matrix extremely high ecreen
Category III: Analysis Reruns (QA/QC)	□ 25. Insufficient sample volume
9. Surrogates	☐ 26. Other (complete description required)
☐ 10. Internal Standards	27. Other (specify): JO448635, LCS NECON
☐ 11. Spike Recoreries	(29,2%)
☐ 12. Blank Contamination	Comments/Explanation:
Category IV: Analysis Reruns (Confirmation)	
☐ 13. Second column	
☐ 14. Contamination check	
☐ 15. Confirmation of matrix effects	
☐ 16. Other (complete description required)	
Notification (check appropriate area):	
Client notified by (name and date):	Client's name and response:
☐ by facsimile	process "as is" re-sample
☐ by telephone ☐ other (explain)	O on hold until O other (explain)
Project Manager (signature and date):	5/26/88

# QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM) PAGE 2 OF 2 LOG# RD-98\_

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Responsibility for performing CA assigned to:	:			
Actions to prevent recurrence	.11.	Initial and Date: _		
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Responsible Manager:	wens		Date:	2/7/0/1/4/
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Assigned to:				
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Corrective Action Verification	<u> </u>			<u> </u>
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Nonconformance Memo Closure				
Nonconformance Memo Closure  QA signature/date:			100	

# CHAIN OF CUSTODY FORMS

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Special Form, n.o.s. Low Specific Activity, r.o.s.	7 UN2974 7 UN2912	Radioactive W		Exclusive U		ent	
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Warning - Fissile Material Controlled Shipment. Do 20 Feet From Other Packages Bearing R	adioactive Labels.	/A_Packages P	rer venicie. In l	oading and S	Storage An	eas, Keep :	n _2ast
11. No. Pkg. Model Package COC/Sp	ec Serial No.	Seal No.	Isotopes				Gr. Wt. Kg.
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12 This is to certify that the above named material	are property classified.	described, pack	raged, marked a	and labeled, a	ind are in t	proper cond	not not
Certifier's Signature On behalf of DOE-RL	Bate , lO	transportation according to the applicable regulations of the Department of Transportation.					
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13. Surface Dose Rate of Package	OFFSITE  a compliance with DOT  Printed Name  AUTHORIZAT  PASSENG  Ltd Qty  Shipped  Routing	Smears of Out Smears of Out C1.41 Bq (2 C1	SURVEY  SNATURE  MENT  Magnosis	TRUCK TRUCK Surface 2 @ 2 mer @ Cab or sleep No. 35-12-0 RECEIVE	LOAD OR REPS NO STATE OF LOAD OR STATE OR STATE OF LOAD OR STATE OR STATE OF LOAD OR STATE OR STATE OF LOAD OR STATE OR STATE OF LOAD OR STATE OR STATE OF LOAD OR STATE OR STATE OF LOAD OR STATE OR	EXCLUSIN 2 mSv/hr (2 0.1 mSv/hr (2 0.2 mSv/h Using N+B Date	E 9SE (00 mremuhr) (10 mremuhr) (12 mremuhr) (14-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7
Surface Dose Rate of Package   Oose Rate of Package   IX <0.005 or	OFFSITE  a Compliance with DOI PASSENG  Ltd Oty  GT.I.  OFFSITE Routing  OFFSITE Routing	Smears of Out Smears of Out C1.41 Bq (2 C1	Survey 23 SNATURE (/// C/// ON SEARCH SINATURE (/// C/// ON SINATURE (// C/// ON SINATURE (/ C/// ON SI	TRUCK TRUCK Surface 2 @ 2 mer @ Cab or sleep No. 35-12-0 RECEIVE	LOAD OR REPS NO STATE OF LOAD OR STATE OR STATE OF LOAD OR STATE OR STATE OF LOAD OR STATE OR STATE OF LOAD OR STATE OR STATE OF LOAD OR STATE OR STATE OF LOAD OR STATE OR STATE OF LOAD OR STATE OR	EXCLUSIN 2 mSv/hr (2 0.1 mSv/hr 0.02 mSv/h Using N+B Date	E 9SE (00 mremuhr) (10 mremuhr) (12 mremuhr) (14-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7

GAMMA-RAY ENERGY ANALYSIS REPORT

FOR SAMPY
BONKH3

376-8851 Thermo Hanford Inc. Radiological Counting Facility THII - RCF 233-5 Project Customer ID BONKH2 Solution RCF ID RCF3067 Semple time, date 4/8/98 4/6/98 Analysis date isotope Activity pCi/gm 21-Cl/gm 3.7e-12 K40 3.7e+00 8.1e-13 Co60 8.1e-01 1129 8.6a+01 8.66-11 1.0a+00 1.0a-12 Ce 137 2.4e+00 2.4a-12 Eu152 2.3e+00 Eu154 2.3e-12 1.5e+00 1.6e-12 Eu155 Th232dau 2.50+00 2.6e-12 U235 3.7e+00 3.7e-12 U238 5.6e+01 5.6e-11

U238dau 1.1e+00 1.1e-12 7.8e-01 7.8e-13 Np237 1.2e-08 Am241 1.2e+04 +/-1.2e-08 Tot Act Gam (pCl/gm) 1.2e+04 Y/Sr-90 NR

3.0a-08 Gross Alpha 3.0e+04 +/- 3.0a+03 Gross Beta +/- 4.5e+02 3.2e-09 Reported as 137-Ca Betas. 3.2e+03**AEA** total 3.5e+04 +/- 3.5e+03 3.80+04 Total Activity (pCl/gm) 3.8e-08 (Ci/gm)

239/240-Pu 26E+04 241-Am 1.3E+04 Definitions:

Note! 152-Eu is not a 100% Beta emitter.

All errors reported at 2 standard device A Assigned as recidual bets from Gammarileta t For soils and natural temples, the following applic The analysis of U238 is based on the activity of Pa2348

The analysis of No237 is based on the activity of Pa233

U235dau is the activity of Pb214 and Bi214, short fived flaughter products of U236. Equilibrium between parent and daughter products probably does not exist in disturbed metassis.

Th32day is the activity of Ac225, Pb212, and Ti206, short fived daughter products of 2327h. Equilibrium between parent and daughter products may not exert in disturbed materials.

Other samples, not containing natural materials, may have inapplicable results for the Th, U, transparence and desogner products. The results must then be balanced for the gross sighs analysis.

N/R means no result or analysis not requested

Albert I. Davis Radiological Manager

4/9/98 Date

Page 1

· 11...

Topi-It Fax Note

#### Figure 1

#### SAMPLE CHECK-IN LIST

	ime Received: 4-14-98 1430 SG#: W0232	<del></del>				
Work (	Order Number: 804238 SAF #: 1398-0	68				
Shippir	ng Container IDSML - #6 Chain of Custody # 898-0	068-05				
1.	Custody Seals on shipping container intact?	Yes [] No []				
2.	Custody Seals dated and signed?	Yes [] No []				
3.	Chain-of-Custody record present?	Yes [ No [ ]				
4.	Cooler temperature					
5.	Vermiculite/packing materials is	Wet [] Dry []				
6.	Number of samples in shipping container:					
7.	Sample holding times exceeded?	Yes [] No []				
8.	Samples have:tapehazard labelscustody sealsappropriate sample labels					
9.	Samples are:in good conditionleakingbrokenhave air bubbles					
10. Where any anomalies identified in sample receipt? Yes [] No []  11. Description of anomalies (include sample numbers):						
Sampi	le Custodian/Laboratory: August William Bate:	4-14-71				
Teleph	noned To:OnBy					



#### Client Sample Screening Results

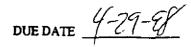
14-Apr-98



(R) 4/14/98

	·			6.31131						
CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
BIII BONKII3		4/14/1998 2:30:00 PM	QUAD21B	4/14/1998 3:05:10 PM	B0NK113	10	27192		8424	841.49429
0	LIQUID		Bkg:	4/14/1998 5:29:05 AM	вко	700	50	0.07142857	6.34	0.9057143
Ani Date: 4/14/1998	Tot Sa	, Alq: 2.50E-02 /	, 1.00E-01 /	Alp; (Dpm/ 8.46	E+03 (uCV	9.53E-01 (	pCV 3.81E	+07 <u>+</u> 2.0E+0		6.6E-07 Lab
Ppt mg: 0.1	Ī	Units: L .	, mi	Beti Alq): -5.38	E+01 Sa):	-6.05E-03 1	L(g): -2.42	E+05 ± 1.5E+0	4 111 /	2.5E-02 Alq

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CUSTOMER BHI	ANA	TASIS	Np237				
MATRIX Other Lig	will san	IPLE DI	ELIVERY GROUP <u>WO232</u> 9A				
PC /1_		'CH NU					
<i>1</i> / —	-						
		aan	al(-)				
LAB SAMPLE ID	CUSTOMER ID		COMMENTS				
1) 8044860		.01 x	£ <sup>-5</sup>				
2) DOY48601 3) WOY48601		-03 x					
3) WOYY(86 0 /		-04 x	E -S EQRL093 Pr.4/1/97 Er.4/1/98				
5)			***************************************				
6)		<del></del>					
7)							
8)							
9)							
10)							
[1]							
12)							
13)							
14)							
15)							
<u>16)</u> 17)							
18)	<del></del>						
19)							
20)	<del></del>						
		<del></del>					
LAB QC ID							
BLANK) JOY4862B		0.2	EORLØ91				
SPIKE) 50448635	<u> </u>	5.0	Pr.4/1/97 Rr.4/1/33				
50448645		9.2	EQRL092				
			Pr.4/1/97 Br.4/1/98				
ACTIONS (Initial & Date)							
1	Y =-13-58		dinho rin				
1) INITIATED ///	-) /) /0 (1) S	EPAR.	ATION LAB RECEIVED \$19/98 DIM SOP(S) # FUCHRIL FOOTH RO				
SOP(S) #	CHACOSOCTEO C		SOP(S) # ELCHRIC GOCK, RO				
	5) (	OUNT	ING/MEASUREMENT				
2) PREP LAB RECEIVED 5-			IVED /				
SOP(S) # RICH	00 5 016 -1	60	ID(C) #				
			10 5-76-98				
2) CAMBLE BEALANDED CHORE	6) I	ATA R	REVIEWED AND W X 5.21-98				
3) SAMPLE REMAINDER STOREL SOP(S) #	Ja-13 4 Put ANA	WYTIC	SOPICIAL PREP STORED 11 L X > 20				
30.(3)#	100		REVIEWED AND CAL PREP STORED ALL-5-26-68 SOP(S) # LICHICCOOL Per 2  a cah 5/16/18 = RICHIS 223				
CPP+ 85 5/21 Kid-R15083	14 8	Dut	a all 5/14/1000 RICHIS 223 RC-048 10/96 REV3				
Kid-R15003			RC-048 10/96 REV 3				